MS48. Teaching and outreach of crystallography

Chairs: Krešimir Molčanov, Bart Kahr

MS48-P1 Olex2 and IYCr OpenLabs

Horst Puschmann[1], Oleg Dolomanov[1]

1. Durham University, South Road, Durham, DH1 3LE, UK

email: horst.puschmann@gmail.com

Olex2[1,2] is a powerful crystallographic package that combines ease-of-use with the powerful tools required for mastering even the most demanding tasks in small-molecule crystallography.

Interested students and novices can achieve remarkable results with a minimum amount of prior knowledge, while more experienced crystallographer will find many tools that make working with structures intuitive and efficient.

This combination leads to the ideal teaching package, where the focus of crystallographic teaching is naturally shifting away from a particular (and often peculiar!) syntax towards a deeper undertanding of the underlying principles of crystallographic model building and refienment.

While novices can focus on the actual crystallography at hand, instructors and those with prior crystallographic experience can equally embark on a learning journey: time has not stood still and exciting and developments in the area of small-molecule software is actively happening.

Olex2 has been used extensively in three teaching events during the Open Labs that were organised during the IYCr: Remotely in Buenos Aires (Argentina) and in person in Izmir (Turkey) and Hong Kong. This contribution will draw on the experiences at these Open Labs and reach the conclusion that has been reached by almost all of the participants: Small-Molecule Crystallography is an exciting area for everyone to get involved in – and one that is no longer firmly in the hand of dedicated structrual analysts.

[1] **OLEX2**: a complete structure solution, refinement and analysis program, *J. Appl. Cryst.* (2009). 42, 339-341.

[2] The anatomy of a comprehensive constrained, restrained refinement program for the modern computing environment - Olex2 dissected, *Acta Cryst.* (2015). A**71**

Keywords: small-molecule, refinement, model, teaching, solution, analysis

MS48-P2 The Nosy Monster and the Carbon Stars. Teaching crystallography through children's literature

Laura Roces[1], Jessica Gómez Álvarez[2], Santiago García-Granda[1]

1. Department of Physical and Analytical Chemistry, University of Oviedo - FUO - CINN, Spain
2. Háblame Bajito, www.hablamebajito.com, Spain

email: laura.uniovi@gmail.com

The University of Oviedo has been actively involved in several crystallography outreach activities during the last few years, particularly last year in connection with the IYCr2014, and some successful projects are being developed to make crystallography close to the public [1]. In this contribution we will introduce one of these activities:*The Nosy Monster and the Carbon Stars* [2]*;* A story about particles, matter and crystals, created for children (age from 4 to 8 approximately). The main objective of this project is to show the beauty of crystals and to integrate some crystallography concepts in the absorbent mind of the youngest children.

Recent trends in education have focused on an integrated curriculum. Children learn best when subject matter is meaningful and useful, and when it is integrated with other areas of the curriculum such as reading, hands-on experimentation or maths. This includes reading or listening to any kind of story. Regarding science, this is specially true. Moreover, knowledge acquisition is even more reinforced when an inquiry-based, discovery-focused approach is used. In this sense, literature is a great tool to transmit knowledge to children.

T*he Nosy Monster and the Carbon Stars* is an illustrated book (hardcover, 23x23 cm, 34 pages). A digital edition of the book, both in English and Spanish, is being distributed free of charge [2]. The book can be used in a classroom or at home to introduce the following basic concepts to children: i) Matter is made of particles; ii) Crystals are built up of perfectly ordered particles; iii) Different arrangement of these particles lead to different kind of crystals with distinct properties. The story with not only introduce a topic, but it will hook listeners and serve to demonstrate abstract ideas. It is ideal to use it to lead off a hands on activity about matter and crystals.

"Mati is a monster but, above all, he is a child, and as a child he's got an inner world which is full of curiosity and color. When he asks his mum what monsters are made of, his mum goes back to the Big Bang to explain him that everything we know comes from the same place, including carbon, of which diamonds, coal, pencils and even us are made! "

Acknowledgements: Financial support from Ministerio de Economía y Competitividad de España (FCT-14-8647 and MAT2013-40950-R)

[1] Acta Cryst. (2011) A67, C803-C804; Acta Cryst. (2013). A69, s253-s254; Acta Cryst. (2014). A70, C1300.

[2] http://elmonstruocurioso.org